

Amendments to the Specification

On page 1, after the title and before the first paragraph, please add the following section heading:

BACKGROUND OF THE INVENTION

On page 2, before the second paragraph, please add the following section heading:

SUMMARY OF THE INVENTION

Please replace paragraph 2 on page 2 with the following amended paragraph:

~~However, in~~ In the louver type view angle control sheet there is a problem that screen brightness is decreased [,] because screen image light in an oblique direction is simply cut, ~~there is a problem that screen brightness is decreased.~~

Please replace the paragraph bridging pages 2 and 3 with the following amended paragraph:

In the invention ~~according to claim 4~~, the problem of decreased of screen brightness is solved by a view angle control sheet characterized in that has lens portions having trapezoidal shapes in cross section are arranged at predetermined intervals, ~~a~~ A wedge-shaped portion between the lens portions adjacent to each other is filled with the same material as the lens portion or with a material different from the lens portion, ~~the~~ The wedge-shaped portion has a bottom surface on a screen image side while having a leading edge on an observer side, and the following relationship is maintained holds at least between a refractive index N2 of a material constituting a slope portion of the wedge-shaped portion and a refractive index N1 of a material constituting the lens portion: $N2 \leq N1$.

Please replace paragraph 1 on page 3 with the following amended paragraph:

In the The view angle control sheet as described above, according to claim 1, the invention according to claim 2 is characterized in that further has an angle θ (degree) formed by the slope portion and a normal line of a light beam outgoing plane that exists in the following range:

$$3 \leq \theta \leq 20.$$

Please replace paragraph 2 on page 3 with the following amended paragraph:

In the view angle control sheet according to claim 2, the invention according to claim 3 is characterized in that When the above-mentioned relationship occurs, the following relationship ~~holds further~~ is maintained between the refractive indexes N_1 and N_2 :

$$0.8N_1 \leq N_2 \leq 0.98N_1.$$

Please replace paragraph 3 on page 3 with the following amended paragraph:

In the The view angle control sheet can also have according to claim 1 or 2, the invention according to claim 4 is characterized in that the following relationship ~~holds still further~~ between the refractive indexes N_1 and N_2 :

$$N_1 - 0.01 \leq N_2.$$

Please replace paragraph 4 on page 3 with the following amended paragraph:

In the view angle control sheet according to any one of claims 1 to 4, the invention according to claim 5 is characterized in that, when a When the previous relationship occurs and the ratio of the refractive indexes N_1 and N_2 is $N_2/N_1 = R$, the following relationship ~~holds further~~ is maintained in the angle θ (degree) formed by the slope portion of the wedge-shaped portion and the normal line of the light beam outgoing plane:

$$-0.01 < R - \cos\theta < 0.002.$$

Please replace paragraph 1 on page 4 with the following amended paragraph:

~~In the view angle control sheet according to any one of claims 1 to 5, the invention according to claim 6 is characterized in that a~~ A ~~cross-sectional shape of the wedge-shaped portion is a substantial isosceles triangle.~~

Please replace paragraph 2 on page 4 with the following amended paragraph:

~~In the view angle control sheet described in any one of claims 1 to 5, the invention according to claim 7 is characterized in that~~ Further, ~~one of the angles formed by two slopes of the wedge-shaped portion and the normal line of the light beam outgoing plane is larger than the other.~~

Please replace paragraph 3 on page 4 with the following amended paragraph:

~~In the view angle control sheet according to any one of claims 1 to 7, the invention according to claim 8 is characterized in that~~ Moreover, ~~the slope portion has a curved cross-sectional shape and/or a polygonal-line cross-sectional shape such that the screen image side differs from the observer side in an angle formed by the slope portion and an observer side surface.~~

Please replace paragraph 4 on page 4 with the following amended paragraph:

~~In the view angle control sheet according to any one of claims 1 to 8, the invention according to claim 9 is characterized in that~~ Additionally, ~~the wedge-shaped portion has a light beam absorption effect.~~

Please replace paragraph 5 on page 4 with the following amended paragraph:

~~In the view angle control sheet according to any one of claims 1 to 9, the invention according to claim 10 is characterized in that~~ Accordingly, ~~the light beam absorption particles are added to the wedge-shaped portion.~~

Please replace the paragraph bridging page 4 and page 5 with the following amended paragraph:

~~In the view angle control sheet according to claim 10, the invention according to claim 11 is characterized in that an An average particle size of the light beam absorption particles is at least 1 μ m and the average particle size is not more than two-thirds of a width of the bottom surface.~~

Please replace paragraph 1 on page 5 with the following amended paragraph:

~~In the view angle control sheet according to claim 10 or 11, the invention according to claim 12 is characterized in that an Therefore, the addition amount of the light beam absorption particle ranges from 10 to 50 % by volume.~~

Please replace paragraph 2 on page 5 with the following amended paragraph:

~~In the view angle control sheet according to any one of claims 1 to 12, the invention according to claim 13 is characterized in that a A function of any one of anti-reflection (AR) [(AR)], anti-static (AS) [(AS)], anti-glaring (AG) [(AG)], and a touch sensor or plurality functions thereof are imparted to at least one surface side.~~

Please replace paragraph 3 on page 5 with the following amended paragraph:

~~The invention according to claim 14 is a Additionally, the invention describes a display device characterized in that a wherein the view angle control sheet according to any one of claims 1 to 13 is bonded.~~

Please replace paragraph 4 on page 5 with the following amended paragraph:

~~The invention according to claim 15 is a The view angle control sheet of the display device characterized in that a view angle control sheet according to any one of claims 1 to 13 is arranged in a crosswise stripe.~~

Please replace paragraph 5 on page 5 with the following amended paragraph:

~~The invention according to claim 16 is a display device characterized in that one view angle control sheet according to any one of claims 1 to 13~~ The view angle control sheet of the display device is laminated on the observer side of a screen image source or two view angle control sheets ~~according to any one claims 1 to 13~~ are laminated on the observer side of the screen image source while being substantially orthogonal to each other.

Please replace paragraph 6 on page 5 with the following amended paragraph:

~~In the display device according to claim 16, the invention according to claim 17 is characterized in that the~~ The width of the bottom surface of the display device is not more than 1/1.5 of a size of one pixel.

On page 6, after the first paragraph, please add the following section heading:

BRIEF DESCRIPTION OF THE DRAWING FIGURES

Please replace the paragraph bridging page 6 and page 7 with the following amended paragraph:

FIG. 1 is a view showing a cross section in a direction of a view angle control sheet according to a first embodiment of the invention;

FIG. 2 is a view showing a cross section in a direction of a view angle control sheet according to a second embodiment of the invention;

FIG. 3 is a view showing a cross section in a direction of a view angle control sheet according to a third embodiment of the invention;

FIG. 4 is a view showing a cross section in a direction of a view angle control sheet according to a fourth embodiment of the invention;

FIG. 5 is a view showing a cross section in a direction of a view angle control sheet according to a fifth embodiment of the invention;

FIG. 6 is a schematic sectional view illustrating a status in which a light beam

reflected from a slope of a wedge-shaped portion of the view angle control sheet reaches an observer side;

FIG. 7 is a view for examining a condition that the light beam is incident to a lens portion such that the light beam is emitted toward a direction perpendicular to the view angle control sheet;

FIG. 8 is a view for examining a condition that the light beam is incident to the lens portion so as to be emitted at a 10° angle with respect to the view angle control sheet;

~~FIG. 9 is a view showing~~ FIGS. 9A-C show various shape modes of a low-refractive index portion;

FIG. 10 is a view showing the cross section of the view angle control sheet in which a slope shape of the wedge-shaped portion exhibits another mode;

FIG. 11 is a view showing an example of a configuration of the view angle control sheet;

FIG. 12 is a view showing another example of the configuration of the view angle control sheet;

FIG. 13 is a view showing still another example of a configuration of the view angle control sheet;

FIG. 14 is a view showing an example of the configuration of a display device provided with the view angle control sheet; and

FIG. 15 is a view showing an example of the conventional view angle restriction sheet.

On page 8, after the second paragraph, please add that following section heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace paragraph 1 on page 9 with the following amended paragraph:

A ratio of the refractive index N1 of the lens portion 12 to the refractive index N2 of the wedge-shaped portion 14 is set in a predetermined range in order to secure optical characteristics of the view angle control sheet S1. An angle formed by the hypotenuse where the wedge-shaped portion 14 and the lens portion 12 are

in contact with each other and a normal line V (line parallel to a normal-incidence light beam to the view angle control sheet S1) of an outgoing light beam plane is formed at a predetermined angle $[\theta_1]$ θ_1 .

Please replace the paragraph bridging page 9 and page 10 with the following amended paragraph:

In the invention, the angle θ_1 is set in the range of 3 to 20 degrees in order to totally reflect the screen image light beam at the slope portion of the wedge-shaped portion to narrow the view angle. In the angle setting of the total reflection plane, an optimum value depends on a distance between $[\text{a}]$ an imaging surface and the view angle control sheet, resolution of the image screen, necessary view angle brightness, and the like. In order to suppress the decrease in resolution caused by ghost generation or the like, it is necessary that positional displacement between the totally reflected screen image and the directly transmitted screen image be decreased by setting angle θ_1 in the range of about 3 to about 5 degrees. Because the decrease in resolution caused by the ghost generation or the like becomes remarkable when the distance between the imaging surface and the sheet is broadened, similarly it is necessary to decrease the angle θ_1 . On the contrary, it is thought that the angle θ_1 ranging from about 5 to about 20 degrees is also required in order to sufficiently exert brightness increase effect. Thus, it is necessary that the optimum value is determined as the angle θ_1 by performing design in appropriate consideration of the view angle and the distance between the imaging surface and the view angle control sheet. With reference to a refractive index difference, similarly the refractive index difference is increased in order to obtain the brightness increase effect in the wide range. On the other hand, when the decrease in resolution caused by the ghost is suppressed rather than obtaining the brightness increase effect only near a front face, it is necessary to decrease the refractive index difference. That is, in the broad distance between the imaging surface and the view angle control sheet, in the case of emphasis on the resolution, it is advantageous that the angle θ_1 is decreased while the refractive index difference is decreased. On the other hand, in the narrow distance between the imaging surface and the view angle control sheet, in order to obtain the brightness increase effect in the wide range, it is advantageous

that the angle θ_1 is increased while the refractive index difference is increased.

Please replace paragraph 1 on page 31 with the following amended paragraph:

~~FIG. 9 is a view showing~~ FIGS 9A-9C show various shape modes of the low-refractive index portion 4. The low-refractive index portion 4 has the substantially triangular shape formed by the hypotenuses of the two adjacent unit lenses 2 and 2. FIG. 9A shows the case where the hypotenuse is formed by a straight line. In this case, an angle θ_{11} formed by the hypotenuse and the outgoing light beam plane normal line is kept constant at any point on the hypotenuse. FIG. 9B shows the case where the hypotenuse is formed by a smoothly curved line. FIG. 9C shows the case where the hypotenuse is formed by the two straight lines. In these cases, angles θ_{12} , θ_{13} , and θ_{14} formed by the hypotenuses and the outgoing light beam plane normal lines depend on the position on the hypotenuse. In the invention, when the angle formed by the hypotenuse and the outgoing light beam plane normal line is not constant as shown in FIGS. 9B and 9C, the effect of the invention can be obtained by satisfying the conditions of the above-described expressions 1 to 7 in the range at least a 90% length of the hypotenuse.

Please replace paragraph 2 on page 32 with the following amended paragraph:

FIGS. 11 to 13 are a view showing an example of the configuration of the view angle control sheet according to the invention. A view angle control sheet S90 S9 shown in FIG. 11 includes a unit lens 92 whose vertically cross-sectional shape is constant in the horizontal direction. A base sheet 91 is arranged on the screen image side and a base sheet 93 is arranged on the observer side. In FIG. 11, although the three components are shown while separated from one another for the purpose of understanding, actually the components are bonded to one another.

Please replace paragraph 1 on page 33 with the following amended paragraph:

In a view angle control sheet S11 shown in FIG. 13, unit lenses having circular truncated conical shapes are two-dimensionally arrayed on the vertical

plane. Top surfaces of the circular truncated conical unit lenses are formed in the same plane, and a base sheet 111 is bonded to the plane. A cavity between the base sheet 111 and the unit lens 112 is filled with the low-refractive index material to form a low-refractive index portion 144. The effect of the invention can be obtained by any one of the configurations of the view angle control sheets S9, S10, and S11 shown in FIGS. 11 to 13.